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Japanese (PDF)

File Wrapper Information

FULL CONTENTS CLAIM + DETAILED DESCRIPTION
TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM OPERATION
EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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Notes:

1. Untranslatable words are replaced with asterisks (***).
2. Texts in the figures are not translated and shown as it is.

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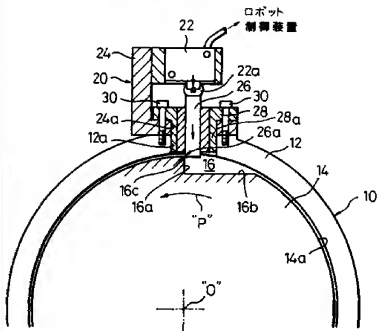
Dictionary. Last updated 10/08/2008 / Priority: 1. Transportation / 2 Architecture/Civil engineering / 3. JIS (Japan Industrial Standards) term

FULL CONTENTS

(57) [Claim(s)]

[Claim 1] In the starting point adjusting device for industrial robots which performs adjustment of the starting point between 2 members in the joint of an industrial robot which carry out relative rotating, and a setup While forming a paragraph in the location corresponding to the starting point of the peripheral surface of the 1st member in said relative 2 member, a starting point adjusting device is fixed to the location corresponding to the starting point of the 2nd member in said relative 2 member, enabling free attachment and detachment. The switch holding fixture with which said starting point adjusting device was fixed to the location corresponding to the starting point of said 2nd member, The switching means for starting point detecting-signal dispatch held at said switch holding fixture, An end is formed in the on-off needle of said switching means possible [engagement]. The other end slides towards the inside of the paragraph formed in the location corresponding to the starting point of said part I material of guidance of direct-acting bearing fixed to said switch holding fixture. The

Drawing selection Fig. 1



[Translation done.]

starting point adjusting device for industrial robots characterized by having the composition which consists of sliding rods which can project and sends a starting point detecting signal from a switching means according to sliding of said sliding rod, and a projection operation according to the relative rotating of the said 1st and 2nd two member.

[Claim 2] The other end of the vertical-wall side where the paragraph formed in said 1st member fell from the right-angled shoulder to the radial direction about a center of rotation, and said sliding rod projects. Said sliding rod is a starting point adjusting device for industrial robots given in the range 1. term of the application for patent in which it changed from the stepper type hollow with the flat bottom side which *****, and said other end side changed from edge-shaped straight-line rod part material, and starting point detection was formed possible only at the time of rotation of the fixed direction of said two members.

[Claim 3] Said direct-acting bearing is a starting point adjusting device for industrial robots given in the range 1. term of the application for patent which has the boss part fixed [which are fixed and is tightly abbreviation-inserted in the receiving hole formed in said 2nd member] to it, and was characterized by things.

[Detailed Description of the Invention]

[Industrial Application]

This invention relates to the starting point adjusting device for industrial robots which can adjust and can set up the starting point between 2 members of the relative rotating nature in each joint simple also at the narrow robot use spot especially about the starting point adjusting device set [which sets up and adjusts the starting point location of each joint in an industrial articulated robot] up.

[Description of the Prior Art]

A robot-aircraft object with the motor by which an industrial robot serves as a source of a drive of action parts, such as a robot revolution barrel, a robot arm, and a robot wrist, and these action parts, It consists of the robot control device which performs motion control of each action part of the robot-aircraft object, and by the end effector with which it was equipped at the tip of a robot wrist, a work is grasped, between each locations is conveyed or the robot work of performing fixed work, for example, assembly operation, to a work is carried out. Therefore, in order for each action part of a robot-aircraft object to carry out high-precision robot operation, the adjustment relation fixed between a robot control device and each action part of a robot-aircraft object must be established. For this reason, when a starting point location is established in a robot action part and each action part is located in a starting point location, according to

instructions of a robot control device, the action part of a robot-aircraft object is made to carry out desired robot operation by setting that starting point location to the robot control device side with high precision. [the reference position setting work which performs starting point adjustment of each action part of a robot-aircraft object, and a setup] in order to aim at adjustment by the side of such a robot-aircraft object and a robot control device It is common knowledge to be carried out using a specific jig in the shipment process in the last stage of a robot production process generally, for example, it is indicated by the U.S. Pat. No. 4,702,665 gazette based on Japanese Patent Application No. No. 127734 [58 to] concerning these people.

However, after a robot goes into a practical use phase at each use spot, which drive motor of each action part of a robot-aircraft object cannot necessarily use adjustment of the starting point location which uses the above-mentioned specific jig, a setup, or a reference position setup simple, for example, when exchanged by failure. Namely, the equipment the case where the use spot of an industrial robot is very narrow, and around a robot When the working range of each robot action part has received restriction for interference evasion with a machinery etc., it becomes difficult for the action part of a robot-aircraft object to make it take the posture for a reference position setup, therefore a reference position setup becomes impossible.

On the other hand, it replaces with the reference position setting method of the robot which uses such a characteristic jig. A member 2 is equipped with a dial gage 8 like illustration at Fig. 2 using the fixing bracket 6 also among two members 2 and 4 of the relative rotating nature in the joint of an industrial articulated robot. Form the hollow 4a of the shape of a V quirk perpendicular to a hand of cut in the location corresponding to the starting point in the correspondence contiguity part of the member 4 of another side, and in process of the relative rotating of the Ryobe material 2 and 4 The easy starting point adjustment mechanism which was made to carry out adjustment of the starting point and a setup, i.e., a calibration, by making into a starting point location the location where the tip of plunger ** 8a of a dial gage 8 fell in the above-mentioned hollow 4a, and reading of the scale of a dial gage 8 pointed to the peak magnitude is also offered. In addition, enter the mark which shows a starting point location beforehand in both the above-mentioned relative rotating nature members 2 and 4, respectively, and [with both coincidence] Wearing of the gage block with edge is enabled at the method of performing adjustment of the starting point, and a setup, or the Ryobe material 2 and 4. At the time of adjustment of a starting point location, and a setup, it equips with the gage block concerned and there is also the common knowledge method

which finds out the relative rotating location whose edge of a gage block corresponds, and was made to perform adjustment of the starting point and a setup.

[Problem(s) to be Solved by the Invention]

It depends for the equipment used for the well-known starting point adjustment mentioned above and execution of the setting method, or a jig on detection of the mechanical starting point location which mainly reads the directions scale of a dial gage 8, and there is un-arranging [which can seldom expect high degree of accuracy] in the accuracy by viewing. And plunger ** 8a of a dial gage essentially Since it is made so that it may be suitable for detecting the displacement component of a field perpendicular to the displacement direction, it is unsuitable for detection of the hollow 4a of the shape of a V quirk shown in Fig. 2 , and the influence of the backlash of Plunger 8a does adjustment of the starting point at the time of detection, and has a bad influence on a setup, namely, there is fault which causes the accuracy fall of starting point adjustment and a setup. Moreover, the V groove hollow 4a is the process in which the relative rotating of relative rotating nature 2 member is driven by a motor, and when a hand of cut carries out arbitrarily in right reverse both directions by the backlash in a drive system, it has the disadvantage which an error generates.

On the other hand, when a robot-aircraft object becomes dirty and goes at the use spot etc. gradually, the mark concerned also becomes dirty or the situation whose execution of starting point adjustment and a setup peeling omission arises and becomes impossible also tends to produce the method of marking beforehand. Therefore, the equipment used for the conventional method and it which the purpose of this invention mentioned above, Acquiring sufficient accuracy, if it depends on a jig in view of a difficult thing Starting point adjustment, The starting point location of each robot action part can be automatically set to the improvement [in setting accuracy], and robot control device side. And since the use spot of an industrial robot is narrow or various equipments etc. exist on the outskirts, let the starting point adjusting device for industrial robots which can be used also under an environment which has restriction in a degree of freedom of motion be an offer plug.

[A solution means and an operation]

In the starting point adjusting device for industrial robots which performs adjustment of the starting point between 2 members in the joint of an industrial robot which carry out relative rotating, and a setup in view of the purpose of above-mentioned invention according to this invention While forming a paragraph in the location corresponding to the starting point of the peripheral surface of the 1st member in said relative 2 member, a starting point adjusting device

is fixed to the location corresponding to the starting point of the 2nd member in said relative 2 member, enabling free attachment and detachment. It is fixed to the location corresponding to the starting point of said 2nd member by said starting point adjusting device, and A switch holding fixture, The switching means for starting point detecting-signal dispatch held at said switch holding fixture, An end is formed in the on--off needle of said switching means possible [engagement]. The other end slides towards the inside of the paragraph formed in the location corresponding to the starting point of said part I material of guidance of direct-acting bearing fixed to said switch holding fixture. Consist of sliding rods which can project and according to the relative rotating of the said 1st and 2nd two member Sliding of said sliding rod, Offer the starting point adjusting device for industrial robots with the composition which sends a starting point detecting signal from a switching means according to a projection operation, a robot control device receives a starting point detecting signal with the rotation detecting signal of a joint drive motor, set up a starting point location automatically, and moreover By the interaction of the sliding rod supported by the above-mentioned direct-acting bearing that there is no backlash precisely free [sliding] and the paragraph formed in the location corresponding to the starting point, between relative 2 members always Since detection of a starting point location arises only when rotation of the fixed direction is given, a fear of influencing adjustment of the starting point and a setup does not have the influence of the backlash in the drive system by a joint drive motor. This invention is hereafter explained still in detail based on the work example shown in an accompanying drawing.

[Example]

Fig. 1 is a sectional view showing the state where one joint part of a robot was equipped with the starting point adjusting device of the industrial robot by this invention. In this Fig. 1, there are two members 12 and 14 rotated relatively in one joint 10 of an industrial joint type robot. These two members 12 and 14 are usually in the composition which the member 14 of another side rotates to one member 12, therefore a member 12 is made into a holddown member and they are explained below by using a member 14 as a rotation member.

The location corresponding to the starting point in the relative rotating peripheral surface 14a which countered the rotation member 14 of the joint 10 at the holddown member 12 when it depended on this invention, That is, when the holddown member 12 and the rotation member 14 are in the relative criteria posture defined beforehand, the paragraph 16 cut deeply and formed in the right-angled configuration is formed in one location chosen arbitrarily. The above-mentioned paragraph 16 has the right-angled flat bottom

side 16b in the vertical-wall side 16a from which it falls to a radial direction to the center-of-rotation point 0 of a joint 10, and this vertical-wall side 16a, and is constituted. And the shoulder 16c of the above-mentioned vertical-wall side 16a is formed as a part for the shoulder accomplished right-angled to the peripheral surface 14a, cooperates with the edge of the end face of the sliding rod mentioned later, and enables highly precise starting point detection.

On the other hand, the location which detects the paragraph 16 formed in the holddown member 12 corresponding to the starting point location of the rotation member 14 in the above-mentioned relative criteria posture is equipped with starting point adjustment and the setting implement 20.

[namely, this starting point adjustment and the setting implement 20] The direct-acting bearing 28 which holds the sliding rod 26 of direct-acting nature with which an end can engage with the actuating lever 22a of the switch holding fixture 24 holding the switching means 22 for electrical-signal generating which consists of a limit switch, and this switching means 22, and this switching means 22, and this sliding rod 26 free [sliding], The set screw 30 which fixes the switch holding fixture 24 to the above-mentioned holddown member 12 of a joint 10 together with this direct-acting bearing 28 is provided, and it is constituted. The above-mentioned starting point adjustment and the switch holding fixture 24 of the setting implement 20 are fixed to the attaching position beforehand formed in the holddown member 12 using the set screw 30. And the actuating lever 22a of the switching means 22 held at the upper part part of this switch holding fixture 24 is energized by the protrusion position which consists of ON or OFF in response to a spring pressure with an internal spring. The penetration pore 24a is formed in this switch holding fixture 24 under the actuating lever 22a of the above-mentioned switching means 22, and the boss part 28a of the above-mentioned direct-acting bearing 28 is inserted in the state of abbreviation tight fitting in this penetration pore 24a and the receiving hole 12a formed in the holddown member 12 of a joint 10. That is, it is equipped with the direct-acting bearing 28 so that there may be no backlash also to the switch holding fixture 24 also to the holddown member 12, and it is attached firmly with the set screw 30. And when ***** 26 counters the paragraph 16 of said rotation member 14 free [sliding] by this direct-acting bearing 28, it is formed so that the energization force by the spring pressure of the built-in spring of the switching means 22 may be received in this paragraph 16 and it may slide and project linearly by free fall.

[*****] although ***** is understood to fall in a paragraph 16 only by free fall [with the straight-line guidance function which does not have a light heart of the direct-acting bearing 28, and backlash in the case of the

robot joint which the axis of rotation of a joint 10 is arranged at the method of perpendicular, therefore rotation of two members of relative rotating nature produces in the level surface] if, as for ***** 26, the paragraph 16 of the rotation member 14 arrives at an opposite location according to the energization force of the internal spring pressure of the switching means 22 -- the inside of the paragraph 16 concerned -- smooth -- direct-acting -- it projects and operates. ***** 26 is formed in a straight-line rod-like structure, and the corner by the side of the projection end face accomplishes Edge 26a here. Therefore, if rotation is carried out in the direction which the rotation member 14 showed by the arrow head P to the holddown member 12 by the operation process of starting point adjustment and a setup and the edge 26a of ***** 26 separates from the right-angled shoulder 16c of the paragraph 16 of the rotation member 14 simultaneous -- ***** 26 -- direct-acting -- [it projects, and / the other end of ***** 26, and the switching means 22 / and] as a result Engagement separates, therefore a starting point detecting signal is emitted from the switching means 22, and it became the composition that this starting point detecting signal was sent out to a robot control device (with no illustration), and the calibration of a starting point setup was attained.

Now, since the vertical-wall side 16a of the right-angled hollow-shaped paragraph 16 is formed as a field to which it pointed in the radial direction about the center of rotation of a joint 10 according to the starting point adjustment and the setting implement 20 which consist of above-mentioned composition The moment the edge 26a of ***** 26 separated from the shoulder 16c of this vertical-wall side 16a, this ***** 26 performs a direct-acting operation rapidly. Since it is in the composition to which a starting point detection operation of the switching means 22 is urged, when the rotation member 14 rotates to an opposite direction, quick straight-line sliding of ***** 26 and projection operation are not produced with the arrow head P of illustration. That is, since starting point adjustment and a setup are performed only by responding to rotation of the fixed direction, a fear of the backlash in the rotation system of a joint 10 influencing and intervening in a setup of a starting point location, and causing accuracy degradation is avoided completely.

[now, starting point adjustment of this invention which consists of above-mentioned composition and a setting device] Equip the holddown-member 12 side of a joint 10 with starting point adjustment and the setting implement 20, and subsequently If a robot control device is made into starting point adjustment and program mode, the rotation system of this joint 10 is operated and feedback of a position detection signal is simultaneously received from a drive motor If the electrical signal which detected the starting

point location from the switching means 22 of the above-mentioned starting point adjustment and the setting implement 20 through detection of the paragraph 16 formed in the location corresponding to the starting point of the rotation member 14 is received, it will set up that the time is the starting point, and a starting point calibration will be completed.

Such a starting point calibration is not only usable, but [a calibration] at the time of the production process of an industrial robot. Also after being installed at the robot use spot and going into a use process, a calibration is made executable for every joint shaft that the broken starting point location should once be recovered after components exchange of exchange of the drive motor of a drive system etc. Therefore, also after making it stop for components exchange of a robot, the calibration of starting point adjustment and a setup can be made to be able to complete promptly, and re-operation of a robot can be recovered in a short time.

In addition, although ***** of illustration had composition which forms a paragraph in the rotation member side and equips the holddown-member side with starting point regulation and a setting implement. On the contrary, the rotation member side is equipped with starting point regulation and a setting implement, and when the mode of the work example which forms a paragraph in the holddown-member side is desirable, even if constituted such, the same operation as the above-mentioned work example can be expected.

[Effect of the Invention]

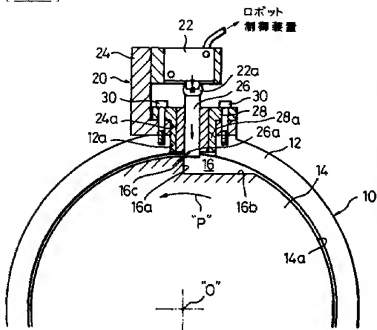
According to this invention, regulation of the starting point of an industrial robot and the joint part of operation especially in an industrial articulated robot and a setup are interlocked with a robot control device so that clearly from the above explanation. The starting point adjustment and the setting device which can be set up are obtained automatically simply per each joint shaft. And since a setup of the starting point is easily executable also under the restricted space environment by an equipment being arranged on narrow the outskirts of the robot use spot or the outskirts, the highest functional state can be made to always maintain an operation of a robot.

[Brief Description of the Drawings]

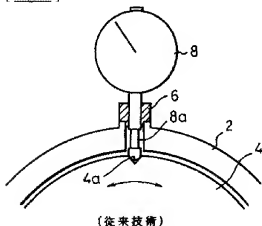
As for Fig. 1, the sectional view and Fig. 2 showing the state where one joint part of a robot was equipped with the starting point adjusting device of the industrial robot by this invention are the conventional robot starting point adjustment and a sectional view having shown one example of a setting device.

10 [.... Paragraph,] A joint, 12 A holddown member, 14 A rotation member, 16 16a [.... Starting point adjustment, a setting implement 22 / A switching means, 22a / An actuating lever, 24 / A switch holding fixture, 26 / A sliding rod, 26a / Edge, 28 / Direct-acting bearing,] A vertical-wall side, 16b A flat bottom side, 16c A right-angled shoulder, 20

[Fig. 1]



[Fig. 2]



[Translation done.]

Report Mistranslation

Japanese (whole document in PDF)